Having thus described the preferred embodiments, the invention is now claimed to be:

1. A method for imaging tissue viability or vascular function in a patient using a magnetic resonance imaging (MRI) apparatus, the method comprising:

acquiring a parametric map having blood oxygenation level dependent contrast;

determining piloting information including at least a selected slice orientation based on the blood oxygenation contrast of the parametric map;

administering a magnetic contrast agent to the patient; and

imaging during a transient distribution of the contrast agent in the patient using imaging parameters based on the piloting information.

2. The method as set forth in claim **1**, further including:

administering a stress-causing agent to the patient to alter patient metabolism during the acquiring of the parametric map.

3. The method as set forth in claim **2**, wherein the stress-causing agent includes at least one of dobutamine, dipyridamole, and adenosine.

4. The method as set forth in claim **1**, wherein the step of imaging a transient distribution of the contrast agent in the patient includes:

acquiring first pass image data during a time when the contrast agent is taken up into an organ of interest to be imaged.

5. The method as set forth in claim **1**, wherein the step of imaging a transient distribution of the contrast agent in the patient includes:

acquiring late enhancement image data during a time when the contrast agent is removed from an organ of interest.

6. The method as set forth in claim **1**, wherein the step of imaging a transient distribution of the contrast agent in the patient further includes:

delaying imaging for a selected time;

subsequent to the imaging delay, acquiring a plurality of delayed parametric images; and

deriving a parametric map having a late enhancement contrast from the delayed parametric images.

7. The method as set forth in claim **1**, wherein the parametric map and the transient distribution image are of at least a portion of the patient's heart.

8. The method as set forth in claim **1**, wherein the acquiring of a parametric map includes:

acquiring a plurality of images having a varying T2* or T2 weighting; and

constructing a T2* or T2 map from the plurality of images.

9. The method as set forth in claim **1**, wherein the acquiring of a parametric map includes:

acquiring a plurality of images during a multiple-echo readout; and

estimating a pixel intensity decay time constant or rate for each pixel based on the plurality of images.

10. The method as set forth in claim **1**, wherein the acquiring of a parametric map includes:

(a) acquiring a plurality of images during a multiple-echo readout;

(b) estimating a pixel intensity decay time constant or rate for each pixel based on the plurality of images;

(c) constructing a first parametric map based on the intensity decay time constants or rates of the pixels;

(d) identifying an object of interest in the first parametric map;

(e) locating a center of the identified object;

(f) estimating a primary axis extending from the located center of the identified object; and

(g) repeating the steps (a)-(c) to construct an improved parametric map corresponding to the located center and the estimated primary axis.

11. The method as set forth in claim **1**, wherein the acquiring of a parametric map includes:

administering a stress agent to the patient;

prior to the administering of the stress agent, acquiring a first set of images;

subsequent to the administering of the stress agent, acquiring a second set of images; and

combining the first and second sets of images to construct a parametric map identifying stressed tissues.

12. The method as set forth in claim **11**, wherein the combining of the first and second sets of images includes:

calculating at least one unstressed statistical quantity for each pixel of the first set of images;

calculating at least one stressed statistical quantity for each pixel of the second set of images; and

combining the stressed and unstressed statistical quantities to form a parametric map indicative of a statistical intensity change due to the administering of the stress agent.

13. A method for assessing tissue in a patient using a magnetic resonance imaging (MRI) apparatus, the method comprising:

acquiring a plurality of parametric images with at least one varying imaging parameter;

constructing a parametric map from the plurality of parametric images;

from at least the parametric map, identifying at least one pilot parameter including at least a volume of interest for a diagnostic image;

administering a contrast agent to the patient; and

imaging the identified volume of interest during influx of the administered contrast agent into the identified volume of interest, the imaging using the at least one identified pilot parameter.

14. The method as set forth in claim **13**, wherein the parametric map includes a map indicative of stress-induced image contrast change or a map of pixel intensity decay time constants or rates.

15. The method as set forth in claim **13**, wherein the parametric map includes a diffusion-weighted image.

16. The method as set forth in claim **13**, further including:

subsequent to the step of imaging the volume of interest, acquiring late enhancement image data during a time period when the contrast agent leaves the volume of interest.

17. The method as set forth in claim **13**, wherein at least one of the step of acquiring a plurality of parametric images and the step of imaging the identified volume of interest includes:

coordinating the acquiring or the imaging with cardiac gating or image navigation.

18. The method as set forth in claim **13**, wherein the volume of interest includes at least a portion of one of a heart, a kidney, a brain, and a liver.

19. The method as set forth in claim **13**, wherein the pilot parameters further include at least one of a direction cosine, a slice position, a field of view, and a slice thickness.

20. The method as set forth in claim **13**, wherein the step of identifying at least one pilot parameter includes:

combining at least one parametric image and the parametric map to form a new image; and

identifying the at least one pilot parameter based on the new image.

21. The method as set forth in claim **13**, further including:

before or during the acquiring of a plurality of parametric images, administering a second contrast agent to the patient, the second contrast agent affecting tissue magnetization in a different and distinguishable manner from the contrast agent, the second contrast agent providing parametric image contrast.

22. The method as set forth in claim **13**, further including:

based on the parametric map, estimating an improved slice orientation; and

repeating the acquiring and constructing steps at the improved slice orientation.

23. The method as set forth in claim **22**, wherein the step of estimating an improved slice includes:

identifying an object of interest in the parametric map;

locating a center of the identified object; and

estimating a primary axis extending from the located center of the identified object.

24. The method as set forth in claim **13**, wherein the administering of a contrast agent includes:

administering a contrast agent containing gadolinium.

25. The method as set forth in claim **13**, wherein the step of acquiring a plurality of parametric images includes:

acquiring multiple-echo image data.

26. The method as set forth in claim **13**, wherein the step of acquiring a plurality of parametric images includes:

before or during the acquiring of a plurality of parametric images, administering an enhancing agent to the patient that enhances a selected contrast of the parametric map.

27. An apparatus for characterizing contrast agent uptake in a patient, the apparatus comprising:

a means for exciting a selected magnetic resonance in the patient;

a means for detecting radio-frequency resonance signals emanating from the patient responsive to the exciting of the selected magnetic resonance;

a means for reconstructing image representations from the detected radio-frequency resonance signals; and

a means for controlling the exciting means, the detecting means, and the reconstructing means, the means for controlling implementing the steps of:

acquiring a plurality of images of a region of interest in the patient wherein the plurality of images parametrically depend upon at least one imaging parameter,

constructing a parametric map based on the plurality of images,

determining optimized imaging conditions based on at least the parametric map, and

first-pass imaging during an uptake of an administered contrast agent into the region of interest wherein the first-pass imaging includes contrast due to the administered contrast agent.

28. The apparatus as set forth in claim **27**, wherein the constructing of a parametric map includes:

obtaining a pixel intensity decay time constant or rate by regression analysis for a pixel of the plurality of images, which plurality of images have varying echo times; and

repeating the regression analysis for each pixel to generate a map of pixel intensity decay time constants or rates.

29. The apparatus as set forth in claim **27**, wherein the constructing of a parametric map includes:

estimating a statistical pixel intensity change between a first portion of the plurality of images acquired prior to an administering of a stress agent and a second portion of the plurality of images acquired subsequent to the administering of the stress agent; and

repeating the statistical estimating for each pixel to generate a map of stress-induced magnetization change.

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